# Appendix C

## NREL SAFETY ASSESSMENT GUIDE

Planned facilities and/or operations will be evaluated against the following criteria to determine the level of risk assessment documents required. Some facilities/operations may require safe operating procedures and a safety analysis review. The ES&H Office (ES&H) can be contacted for guidance and assistance during any stage of the safety assessment process.

**Safe Operating Procedure (SOP)**

An SOP will be prepared and approved for facilities/operations involving

- Chemical usage having hazards that would not be adequately controlled by the measures specified in the NREL Chemical Safety Program.

- All Class 4 lasers.

- Class 3b lasers that produce beams invisible to the eye or are continuous wave (cw) lasers that produce visible beams with greater than 15 mW power.

- All use of radioactive materials. Radiation Safe Operating Procedure (Attachment E) will be used for these SOPs.

- All ionizing radiation sources such as x-ray generators.

- Non-ionizing radiation sources having routine potential for radiation exposure levels exceeding allowable limits, as specified in the NREL ES&H Program 6-4.10, *Non-ionizing Radiation*.

- High-pressure vessels.

- Activities requiring formal Lockout/Tagout procedures. (Other LO/TO documentation methods may be acceptable if a SOP is not otherwise required.)

- Commercially manufactured equipment for which an operating manual is not available, or which has been modified or incorporated into other equipment or processes.

- Other facilities or operations having hazards of a type or magnitude not addressed by NREL policies and procedures.

The standard SOP format (Attachment D) will be used unless specified otherwise above.

**Process Hazard Analysis**

A formal PHA shall be conducted for all planned activities and related equipment that may not be adequately evaluated through the standard SOP and RV mechanisms, yet do not require completion of an SAR. Complexity of the equipment, operating procedures, quantity and hazard of materials used, and potential consequences of process upsets shall be considered when determining if a PHA is necessary, Appropriate PHA formats may be selected from those commonly used in industry (e.g. fault tree, what-if, etc.) PHA team make-up shall include

subject matter experts for the hazards involved and the analysis format utilized.

The need to conduct a PHA shall be determined on a case by case basis. Qualifying process features might include:

- High temperatures and/or pressures where failure of components/systems could result in property damage or personal injury
- Hazardous (flammable/toxic) production material
- Oxygen enriched or oxygen deficient atmospheres
- Hazardous chemical reactions as defined in NFPA-491M
- Unusual fire protection issues

**Safety Analysis Review (SAR)**

An SAR will be prepared and approved for facilities/operations that have the potential for

- Environmental impact beyond that identified in the site environmental assessment (EA) and/or applicable permits.
- Offsite consequences, including the routine generation of non-hazardous noise, odors, etc.
- Substantial equipment loss or damage.
- Programmatic interruption that could affect critical milestones.
- Other unplanned occurrences that present severe risks to life, health, property, or the environment.

**Risk Assessment Documents Not Required**

Facilities/operations that do not meet the criteria for a SOP or SAR, and that can be operated within the requirements of NREL policies and procedures will not require additional risk assessment documents. It is recommended that this determination be documented with a memo to file that indicates

- The name and title of the person(s) completing the safety assessment (SA), the date of the SA, and a summary of the basic findings.